27. Seed and Cone Insects

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Hosts

All conifers grown in seed orchards are susceptible to seed and cone insects. The most damaging seed and cone insects are two seedbugs (*Leptoglossus corculus* and *Tetyra bipunctata*) and five species of coneworms in the genus Dioryctria.

Other insect species that cause seed losses include the slash pine flower thrips *(Gnophothrips fuscus*), pine seedworms (*Cydia* spp.), pine conelet looper (*Nepytia semi-clusaria*), cone borers (*Eucosma* spp.), cone beetles *(Conophthorus* spp.), and tip moths *(Rhyacionia* spp.).

Distribution

Seed and cone insects occur throughout the known range of the hosts, including over 13,000 acres of conifer seed orchards. Two-thirds of the total conifer seed orchard acreage in the United States is stocked with two major species of southern pines (loblolly and slash).

Damage

Cone and seed insects limit the production of seed for nursery stock. Insect damage varies greatly between seed orchards, depending on age, tree species, location, and orchard insect control plan. On occasion, orchards may lose their entire seed crop.

Diagnosis

Seedbugs (figs. 27-1, and 27-2) are sucking insects that feed on developing cones and seeds. Damage caused by these insects cannot be accurately diagnosed in the field; seed should be extracted from the cones and x rayed in the laboratory. The radiographs can then be used to distinguish viable seed. Filled seeds appear dark on the radiographs (fig. 27-3). Seedbug feeding also causes conelet abortion.

Figure 27-1—Adult of the seedbug *Leptoglossus corculus.*

Figure 27-2—Adult of the seedbug *Tetyra bipunctata.*

Coneworms tunnel into cones and partially or totally destroy areas within the cone. Nonviable, discolored cones may be an indicator of coneworm damage. When the cones are cut open, the coneworm tunnels and devoured areas are readily visible (fig. 27-4). Pitch flow, along with insect webbing and frass, may be present on the exterior surface of the infected cone (fig. 27-5).

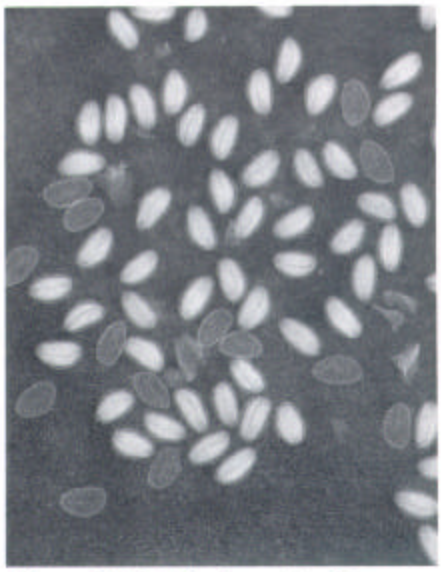

Figure 27-3—Radiograph of pine seeds. Filled seeds are dark inside.

Figure 27-4—Larva and tunnel of coneworm in pine cone.

Improperly stored seed can also be damaged by a number of other insects and pests such as rodents. If germination is poor, the seedlot should be examined for insect damage. Look for chewing marks, holes, or very small punctures with a white or light-colored area around the punctures.

Figure 27-5—Frass and pitch on exterior of cone infested by the webbing coneworm, *Dioryctria disclusa*.

Biology

Both species of seedbugs overwinter as adults. *Leptoglossus corculus* has several overlapping generations; *Tetyra bipunctata* has only a single generation per year. Of the two, *L. corculus* has more impact on seed production.

Coneworms generally overwinter as larvae and infest flowers, buds, and cones or conelets during the growing season. The number of generations per year varies by species-from one in northern latitudes to as many as six in the South.

Control

Cultural—Store seed at the nursery in moisture-proof, airtight containers at subfreezing temperatures (5 °F) to minimize potential insect-caused losses.

Chemical—Seed and cone insects in seed orchards are controlled primarily by applying insecticides. There are five insecticides registered for use in southern pine seed orchards: esfenvalerate, azinphos-methyl, permethrin, acephate, and carbofuran. Most orchard managers apply an insecticide routinely throughout the growing season, rather than waiting for signs of damage.

Selected References

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